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ABSTRACT

This article focuses on the linkage between the quantitative and qualitative distance education research methods. The concept that serves as the conceptual link is termed "complementarity." The definition of complementarity emerges through a simulated study of FernUniversitat's mentors. The study shows that in the case of the mentors, educational phenomena are approached from several points of view rather than from a viewpoint where one perspective excludes another. Because of the interrelationship between everyday reality (qualitative) and reconstructed reality (quantitative) research, a conceptual linkage is required that displays the fruitfulness, yet philosophical and theoretical faithfulness, of interrelating the qualitative and quantitative research procedures. To this end, complementarity is proposed. Complementarity aids the development of a holistic portrayal of mentors while retaining acceptable philosophical, theoretical, and ethical standards. It contributes to a more faithful interpretation within the context of the program in use, and it allows for recommendations that focus on a complement of quantitative and qualitative methodologies. A 42-item reference list concludes the document. (KC)

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FernUniversität
Gesamthochschule

ZIFF PAPIERE 56

J. Peter Rothe

LINKING QUANTITATIVE AND QUALITATIVE DISTANCE EDUCATION RESEARCH THROUGH COMPLEMENTARITY

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Bergson's box as it relates to the individual.

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INTRODUCTION

Distance education programs can be understood or interpreted from a variety of perspectives. The two most common perspectives of researchers are the quantitative and the qualitative.(1) Wherever distance education practitioners employ these two viewpoints with accompanying methodologies in tandem, they tend either to assume a conceptual linkage between the two perspectives, or regard the relationship as being irrelevant to their goal. Assumptions of this nature produce a methodological vacuum.

This article focuses on the linkage between the quantitative and qualitative distance education research methods. The concept which serves as the conceptual link is termed complementarity, hence, a brief description of complementarity documented within selected disciplines is provided. Secondly the philosophical and conceptual features underpinning complementarity are clarified, and thirdly, complementarity is operationalized by developing a simulated study on FernUniversität's mentors.

COMPLEMENTARITY AS A CONCEPT

Literature on complementarity is featured primarily in the physical and social sciences. In the physical sciences, Bohr, a Danish physicist, recognized a basic epistemological problem while exploring the elementary properties of light and matter. He noted that descriptions of experiences had assumed distinct relationships between the behavior of physical objects under evaluation and human observation as an evaluative means. According to Bohr (1958) physical phenomena, like individual atomic processes, are essentially determined by the interaction between (1) the objects in question and (2) the measuring instruments necessary for definition of experimental arrangements. After further examining knowledge and physical objects, Bohr concluded that complementary descriptions may be used to explain the essential aspects of knowledge resulting from the two forms of interaction:

---

(1) The quantitative perspective is also referred to as etic, mechanistic, or atomistic. The qualitative perspective is also referred to as emic, organismic, or holistic.

> Information regarding the behavior of an atomic object obtained under definite experimental conditions may, however, according to a terminology often used in atomic physics, be adequately characterized as "complementary" to any information about the same object obtained by some other experimental arrangement ... Although such kinds of information cannot be combined into a single picture by means of ordinary concepts, they represent indeed equally essential aspects of any knowledge of the object in question which can be obtained in this domain.
>
> (1958, p. 26: emphasis added)

Other physicists such as Born (1932), Compton (1935) and De Broglie (cited in Matson, 1975) suggested that although physics is generally considered an objective science, it has a human referent which substantiates a peculiar cognate relationship between scientific methodology and human interpretation.

Polanyi helped root complementarity in the social sciences by suggesting that men's action and their expressions of convictions can be interpreted in terms of causes which determined them, or the reasons men have for them. If you concentrate only on responses to a given set of stimuli without alternative interpretations of human affairs, you obliterate any grounds on which justifications for the action can be given or disputed. To attain a comprehensive view of human affairs you require alternative interpretations reflecting causes and reasons (Polanyi, 1951).

Bruyn became more precise by affiliating complementarity not only with the social sciences but with participant observation. He wrote that:

> The social scientist is now in a position to add another dimension of knowledge to provide an even sounder base for his field of study. This dimension lies in the personal realities of symbolic meanings in the data of research which can illuminate traditional dimensions of both fact and theory ... Its function is to complement traditional approaches to knowledge.
>
> (1966, p. 175: emphasis added)

In psychology, Maslow (1954), specified that to achieve an appropriate interpretation of behavior, the psychologist requires background understanding. To attain this understanding you need qualitative data, which complements the traditional behavioral perspective comprised of quantitative data (tests). Maslow acknowledged that the two perspectives are not discreet dichotomies, but they tend to coalesce into two unitary, yet contradicting world views.

In support of Maslow, Giorgi (1971) believed that psychologists need to include both experiential (qualitative) and behavioral (quantitative) data to tap the richness of man as he exists. Insofar as behavior and experiences differ from each other, the manner in which these aspects of man become data for psychology also differ. Generally, behavior becomes datum only when its "relevant" aspects are measured, and experience becomes datum only when subjects meaningfully describe the "relevant" aspects of a situation (Giorgi, 1971). Consequently, one must ask how it is that "relevance" is determined.

In reference to the problem of relevance, van Eckartsberg (1971) and van Kaam (1969), two psychologists, recommended a description of the life-world structures, such as human interaction and shared experiences, to provide a context for traditional behavioral research. As such, quantitative and qualitative research methodologies, although different in purpose and world view, can be seen as dialectically interrelating, and they do so at strategic junctures. An interdependence of the two research perspectives becomes recognizable when key junctures, such as (1) the everyday life-world, (2) understanding and interpretation, and (3) ethics are considered, and in turn, become applicable to research in distance education. The following sections will clarify these three junctures:

The Everyday Life World

Everyday life is the fundamental and paramount reality in which individuals are able to understand or be understood by others; a world where the following assumptions are understood to exist:

(a) the existence of other men who have similar consciousness;
(b) interrelations and reciprocal actions amongst men;
(c) mutual understanding amongst men;
(d) pre-given historical and cultural frames of reference; and
(e) situations which at any moment are created by men.

(Schutz and Luckman, 1973)

To all individuals, the everyday world is a natural and social limit-setting context. Within this context, individuals rely on their experiences with others to understand this everyday world; a degree of understanding that enables them to act both in it and upon it. Social experiences as given, form a stock of knowledge, or usual-way-of-doing-things, for individuals. They function as a reference schema for individuals' judgements and explications of world events.

In the context of distance study, students negotiate their planning, effort, and time within the everyday world. They interpret events according to their reference schema arising from their context. Similarily, course writers, tutors, mentors, professors, and researchers, first and foremost operate within a practical empirical world which makes sense to them. Psychological analysis of distance education students and/or practitioners' experiences may afterwards, retrospectively, describe how elements of the world affect their senses, how they are passively perceived, how minds single out certain features from the perceptual field, and how things are delineated and conceived. However, the "natural attitude" or primary understanding of the everyday world does not know these problems (Schutz, 1970; 13).

All distance education research activities emerge from the "natural attitude". Participants, whether they be students or researchers employ, first of all, presupposed knowledge when engaged in the research process as questioners, conceptualizers, or respondents. This knowledge is the bedrock upon which scientific knowledge (abstract, technical) is developed. Schutz focused on this thesis when he wrote:

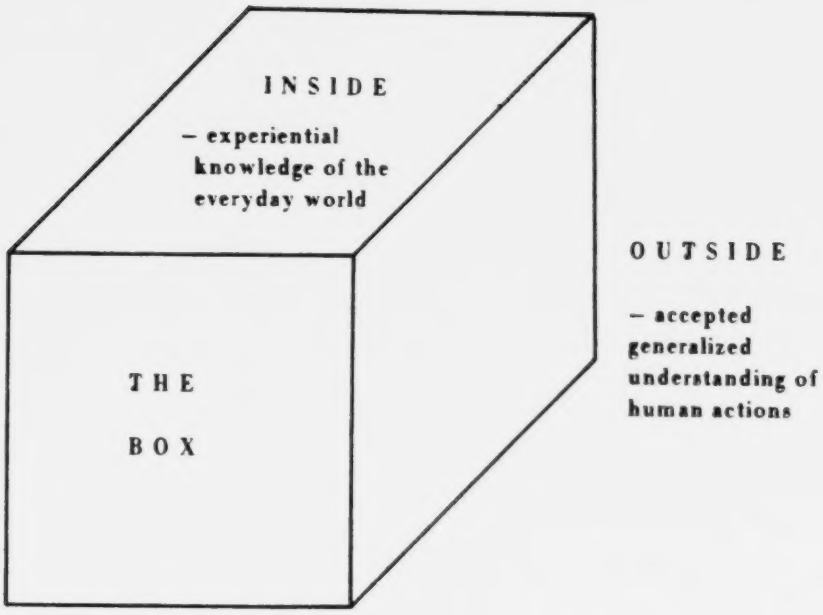
> If the social sciences' aim is to explain social reality, then the scientific constructs on the second level, too, must include a reference to the subjective meaning an action has for the act ... All scientific explanations of the social world can and for certain purposes, must refer to the subjective meaning of the actions of human beings from which social reality originates.
>
> (1971, p. 62)

However, to fully understand the concept and role of everyday life, it must be developed in more depth.

The Life World as Inside and Empirical Research as Outside

Participants in distance education endeavours engage in program activities which can be generalized according to quantitative, or outside view categories such as skill acquisition, achievement of cognitive objectives, psychological traits and sociological trends. However, from a qualitative, or inside point of view, students assign meanings to their jobs, families, mentors, professors and distance study materials and assignments. While studying, they interact meaningfully with their local environments. They are constantly influenced by situational variables such as politics, finances, neighborhoods and friends. To attain a holistic picture of student-distance study participation the inside data should be related to the outside data.

To provide a graphic description of the relationship between the concepts of inside and outside views of human activities, Bergson's box will be symbolically utilized. If one envisions a box, the existence of both an inside and an outside comes to mind. The two can be considered mutually dependent for, if either the inside or the outside is taken alone, the other fails to exist. The existence of the inside pre-supposes the existence of an outside, and vice versa. Specifically, the inside consists of individuals' experiential knowledge of the everyday world whereas the outside is a more abstract form of knowledge consisting of an accepted generalized understanding of human actions.



Bergson's box as it relates to the individual.

The norm of most distance education researchers is to concentrate on the outside of the box by systematically observing patterns in social data which lead to regularities considered translatable into quantitative terms and classified into parsimonious standardized predefined categories (Bruyn, 1966). Distance education exemplars of this approach are McIntosh (1973), McIntosh and Calder (1975), Blacklock (1972), and Schramm (1973).

It is at this point the methodological vacuum appears, for researchers assume that a comprehensive picture can be created through an analysis of only the outside view of human feature. Forgotten is that students have a natural attitude about their affairs which influenced and helped create the outside observable patterns. Both the outside and the inside views interrelate to form a complete system; just as, with the box, for an outside to exist it must have an inside and vice versa. To fully understand outside generalities, researchers require a "Zusammenhang", a linkage, or a complementarity approach. They must consider the inside of the box. In support of this, Dilthey, a social scientist, stated:

> Thus our knowledge of the mental realm is everywhere directly or indirectly grounded in inner experience. Naturally, the validity of this distinction between a physical fact and a mental fact, which presents itself in experience, is in no way affected by the same object, i.e., man, just as the distinction between mathematics and chemistry is in no way affected by the fact that the system of concepts developed in these two sciences are contained in the same natural substances. Man is no more split by the separate development of the two former systems of contents than natural substances are split by the separation between the mathematical, physical, and chemical sciences.
>
> (cited in Platinga, 1980: 31)

According to Dilthey, categories found on the outside of the box are adequate for a scientific explanation of phenomena, but he saw "in space, time, number, etc., little possibility for understanding the inner life of phenomena" (cited in Palmer, 1969). The same phenomenon can contain different systems of relationship. The sciences explain the nature of the phenomenon while the "human studies" understand the expressions of life within a phenomenon (Palmer, 1969). Combined the phenomenon is understood in terms of outside generalities and inside particularities.

If the aim of distance education inquiry is to discover facts and interpret these facts within their social context, complementarity becomes a conceptual necessity since all human action which is scientifically quantified and categorized is still grounded within everyday life. According to Palmer (1969) both the scientific and everyday life perspectives work together in varying degrees in every true act of knowledge. To illustrate this "working together" an examination of the relationship between the inner and outer perspectives in distance education research requires a clarification of the dissimilar, yet interdependent, definitions of understanding and interpretation.

UNDERSTANDING AND INTERPRETATION

Within the everyday world, understanding is a mental operation that can be defined according to other mental operations, and which rests on inner experience. Understanding is the primordial relationship of things, fellow men, the world as a whole, and of man's mode of existence. As noted by Palmer (1967) it is a mode or constituent element of being-in-the world. According to Heidegger:

> In mere encountering of something, it is understood in terms of a totality of involvement; and such seeing hides in itself the explicitness of the assignment relations which belong to that totality ... When something within-the-world is encountered as such, the thing in question already has an involvement which is disclosed in our understanding of the world, and this involvement is one which gets laid out by the interpretation.
>
> (1962: 191)

An individual's primordial understanding of the world means that the chaotic order of the world is overcome, that unity and interconnection enter the world, and that man can operate in the world (Luijpen, 1974). For example, a person's primordial understanding of a house enables him to comprehend 'all' houses. If an individual has no primordial understanding of a house then each house becomes an enigma (Heidegger, 1962). Without primordial understanding, reality is for a person a chaotic agglomerate of concrete, individual, and unique features.

Researchers possess a primordial understanding of the everyday world before and during the time they are involved in quantitative research. Three different levels of primordial understanding relevant to distance education research may be distinguished.

1. The first level comprises "pre-scientific familiarities". For example, a researcher has experiences of time and space before research on a specific problem begins.

2. The second level includes understanding of "certain forms of behavior". For example, when a researcher witnesses a man fleeing and a crowd pursuing, he does not first see 'locomotion' and then draw conclusions from it; on the contrary, he immediately sees the flight as well as the pursuit (Strasser, 1963).

3. The third level of primordial understanding involves certain forms of mimetic expressions such as joy, agression, fear, sadness, and cheerfulness. For example, a researcher notes that a student is sensitive to the mentor's smile or frown by reacting warmly or anxiously to a certain facial expression (Rothe, 1982).

According to Heidegger (1962), when entities within-the-world are primordially understood -- they have meaning. Interpretation consists of deciphering the meanings in human actions. In distance education research interpretation forces the investigator to empathetically interpret student meanings, comprised of their interpretations and primordial understandings. This empathy is the same empathy people use in everyday life whenever people group the taken-for-granted emotions, values, and norms influencing them. It is common sense understanding and interpretation.

At the same time, researchers must question the basis upon which they can empathize authentically. For example, what are their interests for empathy? What are their metaphysical, appraisive and epistemological beliefs upon which their empathy is based? What thought models do they use? What perspectives on the respondent do they have upon which they have interest in data?

In short, researchers' knowledge, experience, and interest must be clarified not only to respondents but to researchers themselves. It requires reflection and self-criticism before, during, and after any research endeavours.

From an outside quantitative research perspective, understanding, according to pre-defined logic, is a 'basic' research aim. Unlike primordial understanding within the inside view, understanding within

the outside view is reconstructed according to rigid paradigmatic parameters. As Kerlinger (1964) suggested, if theory formulation is the ultimate aim of empirical research, explanation and understanding become sub-aims. Typically, in quantitative research a researcher has attained a confident understanding when a causal explanation of the event investigated is achieved (Rudner, 1966), In order to understand, however, one must interpret. Kerlinger (1966), Rudner (1966), and Hempel (1966) all concurred that interpretation within quantitative research includes the acts of analyzing data, making inferences pertinent to the research relations studied, and drawing conclusions about these relations. The following are examples of the types of distance education studies that incorporate the quantitative view of interpretation and understanding:

1. Willingham (1969) compared the relative effectiveness of three methods of teaching composition with an emphasis on correspondence work and tutorials,

2. Cronbach and Snow (1977) correlated student attitude with instructional treatment, and

3. Apt and Ebert (1983) compared characteristics of adult college students enrolled in identical open learning formats offered through a consortium of six states.

Whenever distance education researchers, such as those mentioned above, compute coefficients or correlations, they almost immediately infer (or interpret) the existence of a relation. The significance of the research problem is drawn out when the data is ordered, broken down, and manipulated (Kerlinger, 1966). However, prior to collecting data and to interpreting data into probablistic statements, the researcher should first clarify the everyday interpretations of life upon which inferences can or should be made; an ethical consideration.

COMPLEMENTARITY AND ETHICS

Often, distance education research is based on the principle that the end justifies the means. For example, scores students achieve on a skills test are considered to be proof of poor student competence in a defined area of a program; hence, the researcher recommends improvements in a program. Testing may be perceived as a justified means because it highlights student weaknesses, leading to ends such as program improvements. Similarily, questionnaire findings on student attitudes (means) may lead to program changes (ends).

The end justifying the means is widely held as a questionable moral principle. Truly moral action can be more flexible than "shared calculations". A researcher may have the best intentions and may do what is "right", and yet, through some unforeseen circumstance, the consequences are unhappy. Would this suggest then, that because of negative ends, the means are unjustified? It would appear that motives bear as much, if not more, on moral values, than to ends.

The moral worth of an action can be sought in the action itself and not only in the consequences. While the researcher engages in research, he should ask the question "on what basis this, rather than that?". In the following proposed study on mentors, this topic will prove to be highly relevant.

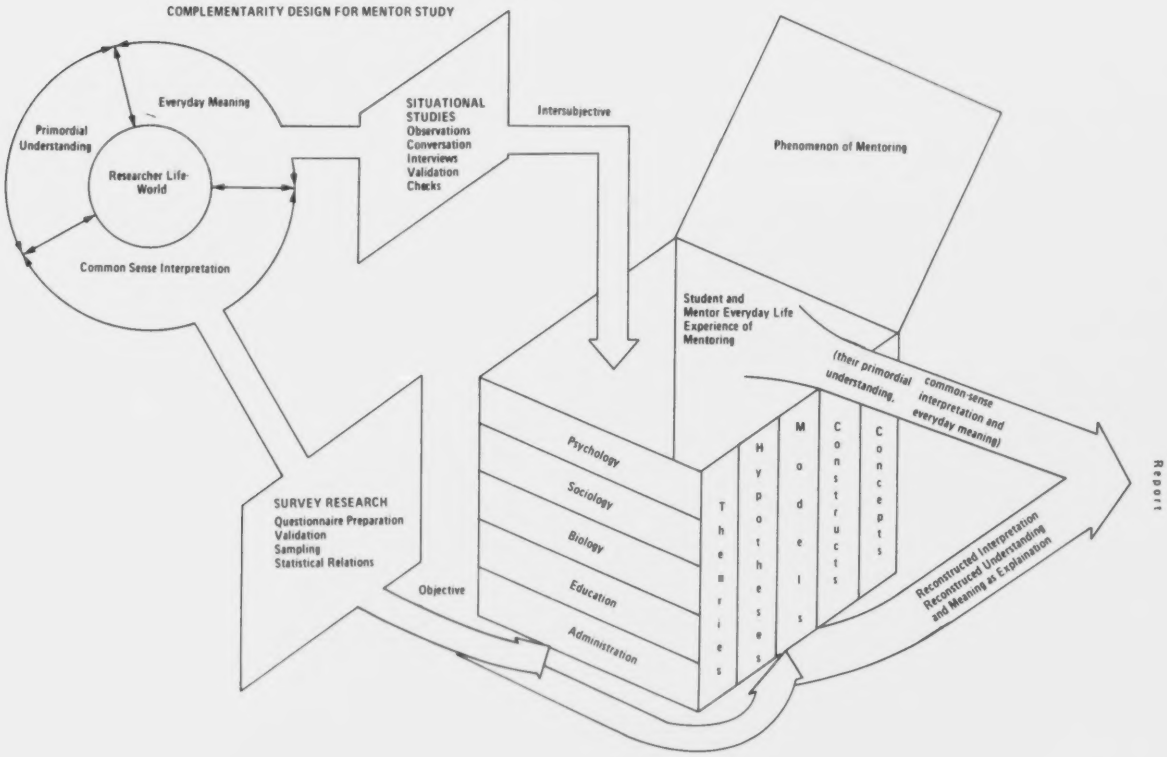
COMPLEMENTARITY AS A CASE: A PROPOSED STUDY ON FERNUNIVERSITÄT MENTORS

To provide tangible utility of complementarity as a viable research concept a simulated study pertaining to FernUniversität's Mentors is described. A study may include the following sample queries:

1. What is the relationship between mentors and students?
2. What are the roles and fuctions of mentors?
3. Do students, perceive mentors as beneficial for their studies?
4. How do students perceive mentors to be beneficial or not beneficial for their studies?
5. How could the process of mentoring be improved?

Underpinnings of the Study

A complementarity oriented study may employ the following design:



Clarification of the Complementarity Design

A The phenomenon of mentoring includes an inside view consisting of mentors and students engaged in the "lived experience" of mentoring. Dilthey would refer to this as "Erlebnis". At this level mentors and students share familiar actions, behaviors and expressions. It is their fundamental reality. Here one would observe; mentors going to work, talking to students, and colleagues, interacting with administration, searching for feedback, etc, students meeting or not meeting with mentors, living with their families, reading materials, and becoming emotional about their workload, timeline etc.

B The phenomenon of mentoring also includes an outside view consisting of theories, hypotheses, models, constructs and concepts found within disciplines such als psychology, sociology, biology, education and administration. For example, mentoring would be viewed from psychological literature on confidence, independence, trust, need, identity etc, sociological literature on relationships, group responsiveness, alienation, isolation, role negotiation, etc., biological literature on health, educational literature on cognition, pedagogy and objectives and administrative literature on cost effectiveness, budget and management. The outside view reflects Dilthey's "Anschauung" of mentoring.

C The researcher begins,activates and concludes his study in his own "lived experience". He has primordial understandings, common-sense interpretations and everyday meaning of his own endeavours. This is the basis for his research, whereby he works in his office, thinks about education, research etc., plans and changes research procedures, makes rough notes, talks to colleaques, and questions himself why he is doing what he is doing.

D Based on the researcher's life world he uncovers the students and mentors' life experiences of mentoring through situational studies where he observes talks, asks opportune questions, formally interviews and checks with the students and mentors his perceptions. Through situational studies the researcher arrives at the value, meaning, texture, everyday negotiation, intents, disappointments and satisfactions in mentoring.

E Still based on the researcher's life world he attempts to make sense of mentoring through the screen of positivist research. He undertakes survey research based on paradigmatic parameters to gather generalizeable facts on the phenomenon of mentoring. He adapts a methodology which investigates theories, hypotheses, models, constructs and/or concepts pertaining to such disciplines as psychology, sociology, biology, education and/or administration. It must be stressed that such an "objective" survey approach still reflects student and mentor responses based on their personal experiences (inside), and researcher's life world.

The totality of inside and outside description provides a unity of meaning, intrinsically temporal and extrinsically generalizeable. The phenomenon of mentoring is determined not only by one perspective irrespective of another, but by the description of one perspective related to the other. The interdependence of the inside and outside realities is a "Zusammenhang" based on the premise that mentoring and research are, first of all intrinsically experienced, only to be later grasped in generalizeable form.

SITUATIONAL STUDIES

Situational studies include observations of events, question-asking immediately following and stemming from the observations, and casual conversation. The researcher steps into a study center and describes mentor activities implicitly by observing their behavior, and explicitly, by talking with relevant individuals. More specifically, information is sought about contextual features such as roles, disappointments, interactions, relationships, expectations, logistics, goals, resources, etc.

In each center the researcher would observe circumstances like: student-mentor interactions, student-student interactions, discussion rules, study preparations, use of materials etc. An attempt is made to see students and mentors as acting normally within the scope of what is routinely possible. It may require some time before the presence of the researcher is accepted and becomes part of the normal routine.

After the observations, the researcher interviews individuals about the observed event or about everyday matters impacting on mentoring. He attempts to further uncover mentor and student views, perspectives, insights and knowledge on mentoring. Thoughout the interview the interviewer should feel his way into the interviewees' internal frame of reference, making every effort to see mentoring through their eyes in order to attain the best possible understanding of their perspectives. Interview responses are essential data, since they are products of symbolic language which discloses the students and mentors to everyday world.

To make sure that the researcher's written accounts accurately reflect the inner view of mentors, three tests of validation must be assured:

Test One

(a) Are the findings faithful and consistent with the experiences of those who live in the situation?

(b) Are the findings faithful representations, descriptions, accounts, or interpretations of what those who ordinarily live those activities would themselves recognize to be true?

(c) If second order constructs of the observers were translated into first order constructs of those being observed, would the observer's report be recognized as a valid and faithful account of "what the activity was really like"?

Test Two

Armed with 'only' the knowledge gained from reading the account presented by the observer, would someone else be able to understand what he was seeing when confronted with the actual life world reality of the events described?

Test Three

Can the reader become the player after having read the rules?

(Psathas, 1973, pp. 12-13)

SURVEY RESEARCH

To attain significant findings on psychological, sociological, biological, educational or economic variables the researcher uses survey findings. He establishes correlations between and amongst relevant samples or populations so that a null hypothesis can be proven or disproven, or generalizable answers can be provided to given questions on perspectives, attitudes or knowledge about mentor activities.

However, an important component of quantitative research is the reliance on parsimonious language for reliability purposes. Symbols are often used. They are highly abstract and display meaning only within quantitative research. For example, concepts such as chi square (x^2), significant relationship ($p < .05$), or degree of freedom (d.f.) are highly abstract symbols used for understanding statistical relationships. They are far removed from the everyday world, and therefore are often perceived by readers as having an autonomous existence apart from everyday life.

The statistics, however, are based on answers provided by students on the basis of their everyday experiences, perceptions and biases. Therefore the statistical data and their reconstructed understandings should be placed in the appropriate context. They should be interpreted in relation to the situational studies. This avoids the possibility of researchers using symbols to portray findings with little or no reference to the everyday world of mentors and students.

STUDY SUMMARY

If a reality like "mentoring" is unilaterally subdivided into questionnaire segments by a researcher, it becomes isolated from everyday reality and may be seen by students as exaggerated or misleading. The use of observations, structured interviews, and casual conversation brings the research outside remoteness, rigidity and unresponsiveness. It provides for a hermeneutic means whereby students, mentors and other respondents become involved in self-expression, appreciation and self-transformation. Rather than being passive respondents, individuals become active agents in the research. They are conscious participants who contribute on a higher plane than merely adjusting to a given external code (Drews and Lipsen, 1971).

CONCLUSION

In distance education research, as portrayed through the simulated study of FernUniversität's mentors, it is the case that educational phenomena are approached from several points of view rather than the case where one perspective excludes another. Because of the interrelationship between everyday reality (qualitative) and reconstructed reality (quantitative) research, a conceptual linkage is required which displays the fruitfulness, yet philosophical and theoretical faithfulness, of interrelating the qualitative and quantitative research procedures. To this end, complementarity is proposed.

The operationalization of complementarity aids the development of a holistic portrayal of mentors while retaining acceptable philosophical, theoretical, and ethical standards. It contributes to a more faithful interpretation within the context of the program-in-use, and it allows for recommendations which focus on a complement of quantitative and qualitative methodologies. Complementarity provides the canvass upon which the researcher can paint a representative picture.

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